

Application Number 10/045,717
Response to Office Action mailed July 7, 2006

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REMARKS

This paper is responsive to the Office Action dated July 7, 2006. Applicant has not amended any of the claims. Claims 1-37 and 39-44 are currently pending.

In the Office Action, the Examiner rejected claims 1-2, 5-6, 12-14, 16-18, 22-23, 28-31, 37 and 40 under 35 U.S.C. 102(e) as being anticipated by Aramaki et al. (USPN 6,618,760) (hereafter Aramaki). In addition, the Examiner rejected claims 3-4, 7-11, 15, 19-21, 24-27, 32-36, 39 and 41-44 under 35 U.S.C. 103(a) as being unpatentable over Aramaki in view of Cain (USPN 6,857,026).

Applicant respectfully traverses the rejections. The applied references fail to disclose or suggest the inventions defined by Applicant's claims, and provide no teaching that would have suggested the desirability of modification to arrive at the claimed invention. More specifically, Aramaki lacks a suggestion of not one, but several features of Applicant's independent claims. Accordingly, the anticipation rejections advanced in the Office Action are clearly improper and must be withdrawn. Furthermore, Cain lacks any teaching that would remedy the clear deficiencies of Aramaki with respect to Applicant's claims. Accordingly, the obviousness rejections, with respect to several of the dependent claims, must also be withdrawn.

Prior to discussing the current rejections, however, Applicant wishes to briefly comment on the progress of prosecution of this Application to date. In particular, Applicant questions why the Examiner, after several prior Office Actions and discussion with the Applicant, would now advance anticipation rejections based on Aramaki (formerly applied as a secondary reference), particularly when such rejections based only on Aramaki are unequivocally deficient, as explained in detail below. Indeed, in the previous Office Action, the Examiner rejected the former claims as being either anticipated by Cain or obvious over Cain in view of Aramaki. Now, after Applicant has already submitted several responses, conducted an Examiner Interview, submitted an RCE Application, the Examiner is advancing entirely new anticipation rejections (with respect to the amended claims) based solely on the Aramaki reference, which was formerly recited only as a secondary reference.

In other words, if the current claims are in fact anticipated by Aramaki (as asserted by the Examiner), then it is unclear why the previous claims were not rejected by the Examiner on a similar basis since the previous claims were broader than the current claims in various respects.

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Instead, the Examiner rejected the claims based on an obviousness rejection using Aramaki as only as secondary reference. 37 C.F.R. 1.104(c) 2 requires the Examiner to cite the "best references" at his or her command. Given this fundamental change in the Examiner's position during the prosecution of the current Application to date, it is difficult for Applicant to ascertain the Examiner's true reasoning for rejecting the claims, or to advance any further clarifying amendments without an apprehension that the Examiner will again change his position. At this point, Applicant is beginning to surmise that an Appeal will be necessary in this case. However, Applicant respectfully requests the Examiner's fair consideration of the following arguments, as an Appeal seems to be entirely unnecessary in this case, given the numerous and clear distinctions between the pending claims and the applied prior art.

In the following discussion, Applicant focuses on the features recited in independent claim 1. Although the other independent claims do not recite the exact features of claim 1 or have identical scope, several arguments advanced below also apply with respect to the other independent claims. For the record, Applicant disagrees with the Examiner's conclusory statements in the Office Action that all of the independent claims have the same scope. In any case, since the Examiner's analysis in the Office Action was set forth only with respect to independent claim 1 and its dependent claims, the following comments will focus on claim 1 and the clear deficiencies in the Examiner's rejection of this claim.

Method claim 1 recites storing, within a network router, a forwarding tree having a set of nodes, wherein the nodes include leaf nodes that correspond to destinations within a computer network. In addition, method claim 1 specifically requires next hop data external to the forwarding tree, where the next hop data represents network devices neighboring the network router. Claim 1 further recites storing, within the leaf nodes of the forwarding tree, indirect next hop data that map the leaf nodes of the forwarding tree to the next hop data that is external to the tree, wherein at least two different ones of the leaf nodes of the forwarding tree contain indirect next hop data that references the next hop data for the same neighboring network device. Thus, claim 1 requires that at least two of the leaf nodes contain indirect next hop data that map the two or more leaf nodes to the same next hop data external to the tree, thus mapping the two or more leaf nodes of the forwarding tree to the same next hop.

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In addition, claim 1 recites identifying a key within a network packet, and traversing a subset of the nodes of the forwarding tree within a network device by testing at least one bit of the key per each of the traversed nodes, wherein values of the tested bits in the key determine a path traversed along the forwarding tree until reaching one of the leaf nodes of the forwarding tree. Finally, claim 1 recites upon reaching a leaf node of the traversed path, using the indirect next hop data within the leaf node of the traversed path to select a next hop from the next hop data external to the forwarding tree, and forwarding the packet to the selected next hop.

In the Office Action, the Examiner indicated that Aramaki discloses all of these features recited in claim 1 and rejected claim 1 (and the other independent claims) under 35 U.S.C. 102(e) as being anticipated by Aramaki. Contrary to the Examiner's analysis, however, several features of claim 1 (and similar features of various other claims) are not disclosed or suggested by Aramaki. Furthermore, the Examiner's analysis is totally contrived, relying upon disparate unrelated passages of Aramaki to essentially reconstruct the claim language recited in claim 1.

Prior to discussing the specific passages cited by the Examiner from Aramaki, Applicant first notes that the teaching of Aramaki is not related to packet forwarding scheme that uses a forwarding tree. Instead, the teaching of Aramaki describes a packet forwarding scheme that uses sets of routing tables. While Aramaki mentions radix tree retrieval methods in the background section as prior art, none of the important features of Applicants claims (addressed below) are suggested by Aramaki in this context. Moreover, Aramaki clearly distinguishes such radix tree retrieval methods from "expansion methods" that use retrieval tables, which appear to be the types of methods described in the detailed description of Aramaki. To be sure, the background of Aramaki clearly distinguishes these different methods, first mentioning binary tree retrieval methods (col. 2, lines 5- 21), next explaining radix tree methods (col. 2, lines 22-51), and then explaining conventional expansion methods that use retrieval tables (beginning on col. 2, lines 52) that form the basis for the Aramaki invention.

The actual teaching in the detailed description of Aramaki concerns expansion methods that are purportedly different than the conventional tree-based methods. This teaching of Aramaki in the detailed description does not appear to concern radix tree retrieval methods whatsoever. The Examiner's analysis simply plucks disparate passages of Aramaki that discuss the different radix tree (in the background) and expansion methods (in the detailed description) in

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an attempt to reconstruct Applicant's claim language in the context of a forwarding tree technique. A person of ordinary skill in the art would not have even fathomed the contrived reconstruction advanced by the Examiner based on the actual teaching of the Aramaki reference, and several features of the claims are clearly lacking from Aramaki. Moreover, when properly understood, the forwarding structure taught by Aramaki is entirely different from the structure set forth in Applicant's claim 1

For example, the Examiner stated that Aramaki discloses storing a forwarding tree having a set of nodes (citing column 2, line 5 to column 3, line 43), and storing, external to the forwarding tree, next hop data representing network devices neighboring the network router (citing column 1, lines 21-26). These cited passages, however, are entirely unrelated to each other, and would not have, either alone or collectively, suggested storing a forwarding tree and storing next hop data external to the forwarding tree. In particular, to the extent that the passage at column 2, line 5 to column 3, line 43 teaches a forwarding tree, the forwarding tree of column 2, line 5 to column 3, line 43 is not in any way used with next hop data external to the forwarding tree. Similarly, even if the passage at column 1, lines 21-26 could be interpreted as teaching external next hop data, this passage has nothing to do with a forwarding tree and there is no teaching that references the structure from leaf nodes of a forwarding tree. Indeed, the passage at column 1, lines 21-26 concerns a retrieval table that, according to Aramaki, is used instead of a forwarding tree. This certainly lacks any suggestion of storing next hop data external to a forwarding tree in the context of a forwarding tree routing technique. In short, the disparate, unrelated teachings in Aramaki at column 2, line 5 to column 3, line 43 and column 1, lines 21-26 do not, either alone or collectively, suggest storing a forwarding tree having a set of nodes, and storing, external to the forwarding tree, next hop data representing network devices neighboring the network router, as required by claim 1. The Examiner's statement appears to directly contradict Aramaki that describes the use of retrieval tables in place of a forwarding tree. There is no suggestion in Aramaki to somehow use both forwarding trees and retrieval tables; nor is there any teaching as to how to link the structures in some hybrid fashion.

In the Office Action, the Examiner also stated that Aramaki discloses storing, within leaf nodes of the forwarding tree, indirect next hop data that maps the leaf nodes of the forwarding tree to the next hop data, wherein at least two different ones of the leaf nodes of the forwarding

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tree contain indirect next hop data that references the next hop data for the same neighboring network device. For this conclusion, the Examiner cited column 5, line 41 to column 6, line 3 of Aramaki. This entire passage, however, is irrelevant to forwarding tree methods, and instead concerns a method for retrieving hop pointers from retrieval tables. For this reason, the passage at column 5, line 41 to column 6, line 3 does not suggest storing indirect next hop data "within leaf nodes of a forwarding tree", as required by claim 1. This feature is, quite simply, lacking from Aramaki. Furthermore, the vague mention in Aramaki of conventional radix tree methods in the background section, and the unrelated teaching in Aramaki of a packet forwarding scheme that uses routing tables having internal pointers would not have suggested, in any way, a technique in which indirect next hop data is stored within leaf nodes of a forwarding tree so as to map the leaf nodes of the forwarding tree to externally stored next hop data.

The Examiner also stated, in the Office Action, that Aramaki discloses using the indirect next hop data within the leaf node of a traversed path of a forwarding tree (such as a radix tree) to select a next hop from the next hop data external to the forwarding tree. For this conclusion, the Examiner cited column 6, line 17 to column 7, line 10. This conclusion, however, has no factual basis. In particular, the passage at column 6, line 17 to column 7, line 10 fails to suggest indirect next hop data within a leaf node of a traversed path of a forwarding tree, and also fails to suggest the selection of a next hop from the next hop data external to the forwarding tree. Instead, this passage of Aramaki concerns a retrieval method that uses tables, and not a forwarding tree at all, much less a forwarding tree that stores indirect next hop data within its leaf nodes that map to next hop data external to the forwarding tree.

In summary, almost every feature of claim 1, when properly read in context of this claim, is lacking from the Aramaki reference. Various ones of the arguments advanced above also apply with respect to the other independent claims. Moreover, the secondary Cain reference lacks any teaching that would remedy the basic deficiencies of Aramaki addressed above. Additional discussion of the Cain reference relative to the current claims can be found in Applicant's previous response.

As detailed above, the teaching of Aramaki is not related to packet forwarding scheme that uses a forwarding tree. Instead, the teaching of Aramaki describes a packet forwarding scheme (referred to as an expansion method) that uses sets of routing tables. While Aramaki

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mentions radix tree retrieval methods in the background section, Aramaki clearly distinguishes such radix tree retrieval methods from the expansion methods that use retrieval tables. The Examiner's analysis simply plucks disparate passages of Aramaki that discuss these different methods, in an attempt to reconstruct the features recited in Applicant's claims based on some concocted hybrid mechanism combining routing tables and forwarding trees in a manner that is not described in the prior art. A person of ordinary skill in the art would not have arrived at the claimed invention, in view of Aramaki. Indeed, as explained above, many of the features of Applicant's claims are not disclosed or suggested by Aramaki.

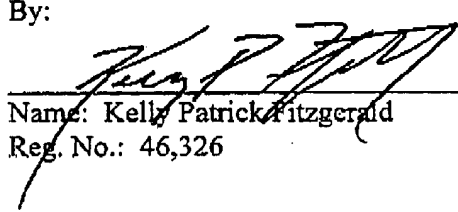
In view of the arguments above, Applicant reserves any further comment on the dependent claims. However, Applicant does not acquiesce to any of the Examiner's rejections or interpretations of the prior art. Accordingly, Applicant reserves the right to present additional arguments with respect to any of the independent or dependent claims by way of appeal.

All claims in this application are in condition for allowance. Applicant respectfully requests reconsideration and prompt allowance of all pending claims. Please charge any additional fees or credit any overpayment to deposit account number 50-1778. The Examiner is invited to telephone the below-signed attorney to discuss this application.

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October 6, 2006
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